REMARKS

The amendment does not involve new matter. The change to claim 38 is supported by page 14, lines 25-28. New claims 39 and 40 are supported by original claims 5 and 6.

In the January 9, 2009 Office Action, claims 28, 31, 33 and 37-38 were rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 3,027,911 (Gilmore) in view of A.H. Church, "ALTERING WOUND SPRINGS To Modify Their Deflection Rates" (Church). This rejection is respectfully traversed. The arguments presented in the response filed March 9, 2009 are incorporated by reference but not otherwise repeated

Claim 28 calls for a method of preparing and using a coil spring in a pressure relief valve and requires a) measuring the spring rate of the coil spring; b) modifying the spring after measuring its spring rate so as to modify its spring rate to be within ±2% of a target spring rate, and c) building a pressure relief valve having an inlet comprising an inlet valve seat, a disk member closable on the inlet valve seat and a mechanism biasing the disk member on the inlet valve seat, a body, and an outlet, wherein the disk member and inlet valve seat are configured to provide a huddling chamber, with the modified coil spring being used in the biasing mechanism.

The Advisory Action mailed March 24, 2009 takes the position that Gilmore discloses a relief valve device, and that it would be desirable to provide a spring with a desired tolerance when building the valve of Gilmore to provide greater accuracy. Applicant's traverse this position. As noted earlier, the only uses for springs that need such modified rates discussed in Church are weighing devices and governors. There is no suggestion that springs used in pressure relief valves need to have a tight range of spring rates. And in fact, the very nature of Gilmore in particular, and prior art pressure relief valves in general, dictates that the springs with a commercial tolerance in the spring rate are acceptable. When a device such as the pressure regulating valve of Gilmore is built, it is a simple matter to deal with a variation in the rate of the given spring used to build the specific device by simply turning sleeve 32 to obtain the desired compression and hence the desired spring force. There would be no inherent benefit in Gilmore from using a spring with a more precisely known spring rate. Since the set

pressure has to be set when the valve is built anyway, as long as the spring rate is within normal tolerances, the valve of Gilmore can be built just as well with a commercially available spring as one with a modified spring rate.

There is no teaching or suggestion in Gilmore to either measure the spring rate of any spring, or to modify the spring rate. As outlined on page 4 of the specification, valve manufactures typically specify a reduced operating range for their valves to account for the spring rate tolerance. Until the present invention, a person of ordinary skill in the art would not have thought of taking a given spring and modifying its spring rate and then using the modified spring to build a pressure relief valve.

Since it would not have been obvious absent hindsight of the present invention to combine the teachings of Gilmore and Church, claim 28 is patentable over Gilmore and Church. Claims 31, 33, 37 and 38 are dependent on claim 28 and are patentable over Gilmore and Church for at least the same reasons as claim 28. Thus, all the claims under consideration in the application are allowable over the cited prior art. Further, since claim 28 is a generic claim, the allowability of claim 28 requires the species restriction to be withdrawn. Claims 29, 30, 32 and 34, dependent on claim 28, should be brought back into consideration and allowed.

Claim 38 is further patentable over Gilmore. Claim 38 requires a secondary orifice between the valve seat inlet and the outlet, the secondary orifice being sized so that gas flows from the inlet in a sonic flow and so that gas flows through the secondary orifice in a sonic flow when the valve opens due to a pressure in the inlet exceeding a set pressure. The Office Action refers to "orifice" 48 in sleeve 56 as satisfying this requirement. However, Gilmore teaches that sleeve 56 include multiple "ports" 48. There is no suggestion that these ports create an orifice that is sized to create sonic flow when the valve opens. On the contrary, a person of ordinary skill in the art recognizes that the ports are provided to have as much open flow area as possible. The ports are needed because the sleeve 56 is used to guide the valve to reclose. Since the sleeve exists, multiple ports must be provided through it to allow for escaping fluid. There is no reason from Gilmore to size these ports to create the required orifice.

The Advisory Action takes the position that sonic flow features are dependent on the use and environment of the valve, which are not specified, and that the ports of

Gilmore would be capable of sonic flow "at some flow rates". This position is traversed. Claim 38 now specifies the use and environment and flow rate when it states that there is sonic flow through the inlet valve seat when the valve opens. Further, because there is sonic flow though the valve seat when the valve opens, there is no way to further increase the flow rate through the valve. Once sonic flow is achieved through the inlet, an increase in the pressure feeding the inlet will not further increase the flow rate. Thus, the valve will never have a higher flow rate than when the valve opens. While it is true that the ports 48 of Gilmore might be able to create sonic flow at high enough flow rates if they were in an independent system, they are not in such a system. The only way that the ports in Gilmore can create sonic flow if the valve opens and has sonic flow through its inlet seat is for the ports to be sufficiently small. There is no disclosure that the ports are small enough to create sonic flow, and there is a disincentive in Gilmore to make them that small, because the ports are designed to quickly evacuate whatever fluid escapes past the valve seat 45.

Claims 39 and 40 are further patentable in specifying a that the modified spring is built into a valve that has a blow-down value of less than about 10%, and less than about 5%. These blow-down levels are very low. Conventional pressure relief valves typically have a blow-down value in the 20% or higher range. Gilmore discloses a plastic seal ring pressure relief valve that includes a spring 48 that holds a valve 38 on seat 45 until sufficient pressure on the valve lifts valve 38 off the seat. At this point the valve has a high blow-down value, meaning that the valve stays open until the pressure in the inlet falls well below the set pressure that was sufficient to first dislodge the valve from the seat. There is nothing in Gilmore that suggests that it is desirable to have a low blow-down value

It is believed that the case is in condition for allowance. An early notice to that effect is respectfully requested.

Applicants respectfully request the Examiner to review the claims and the prosecution history, including Office Actions issued by the U.S. Patent and Trademark Office, for U.S. Patent No. 7,337,796 and pending U.S. Patent Application Serial No. 11/840,053, since the specifications include common subject matter. The '796 patent

issued from a divisional application of the present application. The '053 application is a divisional of the present application.

Respectfully submitted,

Steven P. Shurtz
Registration No. 31,424
Attorney for Applicants

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BRINKS HOFER GILSON & LIONE
405 S. Main Street
Suite 800
Salt Lake City, Utah 84111-3400
Direct Dial: (801) 333-7906